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The induction of major histocompatibility complex class II expression is sufficient for the direct activation of human CD4+ T cells by porcine vascular endothelial cells.

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BACKGROUND: The role played by major histocompatibility complex (MHC) class II-positive vascular endothelial cells in organ graft rejection is unknown but potentially very important. Methods. The MHC class II-negative porcine vascular endothelial cell line PIEC was stably transfected with the human class II transactivator CIITA, in order to induce MHC class II expression without the coinduction of T-cell costimulatory ligands. These PIEC cells were compared with interferon gamma-treated PIEC cells for their capacity to stimulate the proliferation of pure human CD4+ T cells. Results. The CIITA-transfected PIECs were as effective as interferon y-treated PIECs for stimulating unprimed human CD4+ T cells, the peak response with the CIITA-transfected cells in fact occurring earlier (day 3 instead of day 5). Monoclonal antibodies to SLA-DR substantially inhibited the CD4+ T-cell responses in both cases. However, whereas the response to interferon gamma-treated PIEC was partially inhibited by CTLA4-Ig, that to CIITA-transfected PIEC was not. Conclusions. The strong stimulation of CD4+ T cells by the specific induction of MHC class II antigens demonstrates that PIEC cells constitutively express functionally effective levels of costimulatory ligands. This finding strengthens the case that vascular endothelial cells are professional antigen-presenting cells and that MHC class II-positive vascular endothelial cells might play a role in the rejection of organ allografts.

PMID: 10755554 [PubMed - indexed for MEDLINE]

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